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200-POUND DIBORANE SHIPPING CONTAINER

DESIGN & PERFORMANCE

Developed Under Contract Number NASW 1827

SUBMITTED JUNE 1971

by

CALLERY CHEMICAL COMPANY

DIVISION OF MINE SAFETY APPLIANCES COMPANY

CALLERY, PENNSYLVANIA

16024

200-POUND DIBORANE SHIPPING CONTAINER DESIGN AND PERFORMANCE

TABLE OF CONTENTS

200-POUND DIBORANE SHIPPING CONTAINER

BACKGROUND

Callery Chemical Company has been shipping diborane as a flammable compressed gas since 1953 and as a liquid since 1959. Callery holds Special Permit Number 930 for shipment of gaseous diborane and diborane-inert gas mixtures in non-refrigerated overpacks, under specific conditions outlined in the permit. Callery also holds Special Permit Number 970 for shipment of liquid diborane in overpacks containing dry ice for refrigeration. These permits were rewritten and reissued in their present wording in January 1968. Over the years Callery has an excellent record for safe shipment of diborane. In addition we have handled diborane with consistently excellent safety records in our laboratories and production plants.

Currently the largest single package permits shipment of up to 40 pounds of diborane in a DOT-3AA2400 cylinder surrounded by dry ice in an insulated box. Gross shipping weight of this package is about 1300 pounds, and Special Permit 970 requires delivery within ten (10) days.

Prospect of increased future demand for diborane renders this package inadequate for the projected quantities and impractical from the standpoint of handling labor.

In accordance with the anticipated increased use of diborane, NASA awarded Contract Number NASW-1827 to Callery Chemical Company for the design and development of a container for shipment of approximately 200 pounds of liquid diborane. Work began on 7 November 1968 and has continued to date under the same contract number.

Notification of this work was given to the Department of Transportation and to the Bureau of Explosives on 15 November 1968. Upon completion of the initial design, complete drawings were submitted to these agencies on 15 July 1969. Callery representatives met with Bureau of Explosives personnel on 24 September 1969, and the Bureau's recommendations were incorporated into the design. An exchange of comments on the design was made with D.O.T. in November and December 1969. Subsequently the container has been tested with the results presented herein.

200-POUND DIBORANE SHIPPING CONTAINER

DESIGN

Design concept for this container was selected to take full advantage of the success achieved in shipping diborane for over fifteen years. On this basis dry ice was chosen as the refrigerant; because this eliminates the need for control devices used in liquid nitrogen or other liquid flow-type refrigeration systems. In addition dry ice is comparatively much easier to obtain and add to a container which has been delayed in transit.

Detail design of the container was performed by CVI Corporation, subsidiary of Pennwalt Corporation, under subcontract to Callery. Full advantage was taken of Callery's experience in terms of materials of construction, valve types, etc. for diborane service. CVI contributed the expertise in cryogenic vessel design technology to achieve the necessary insulation efficiency and strength. Unlike Callery's previous diborane cylinder overpacks, the new container depends to a lesser degree upon the dry ice and to a greater extent on a much more effective insulation around the inner tank containing the diborane.

Reference to Figure 1 and Figure 2 will show the general layout of the new container; with a 36-inch diameter spherical

inner tank for the diborane, surrounded (except for the dry ice chamber) by a 48 inch diameter cylindrical shell containing perlite insulation evacuated to about ten microns absolute pressure. Over 100 pounds of dry ice may be added through a bellows-sealed neck into a chamber in direct contact with the top of the sphere. The spherical tank containing the diborane is coded for a maximum working pressure of 500 psig at -320 to +100°F., protected by a 550 psig rupture disk and 550 psig relief valve connected in series.

Instruments are provided to indicate temperature, pressure, and liquid level. A audio-visual alarm is activated by temperature in excess of -35°C., which should occur after about 20 days; this allows over ten days before reaching 0°C., still well below the point where pressure relief will occur.

In keeping with end use requirements of NASA, the liquid unloading rate was designed for a minimum of 0.2 pound per second with 100 psi pressure differential. Actual unloading rate of 0.2 pound per second was obtained with a pressure differential of only 20 psi.

The container is designed for handling by fork lift or by crane; gross shipping weight is about 2890 pounds. Envelope dimensions are 4'-4" diameter and 6'-6" height. Center of gravity is shown on Figure 1 and Figure 2.

All supports, components, and auxiliaries are designed to withstand, without damage or leakage, forces of 8 g vertically down and in all horizontal directions, and 4 g vertically up.

Storage time, volumetric loading, and pressure-temperature limitations are discussed in the Performance section following.

CVI Corporation has calculations for strength of the inner vessel support system, and these could be made available for review if necessary.

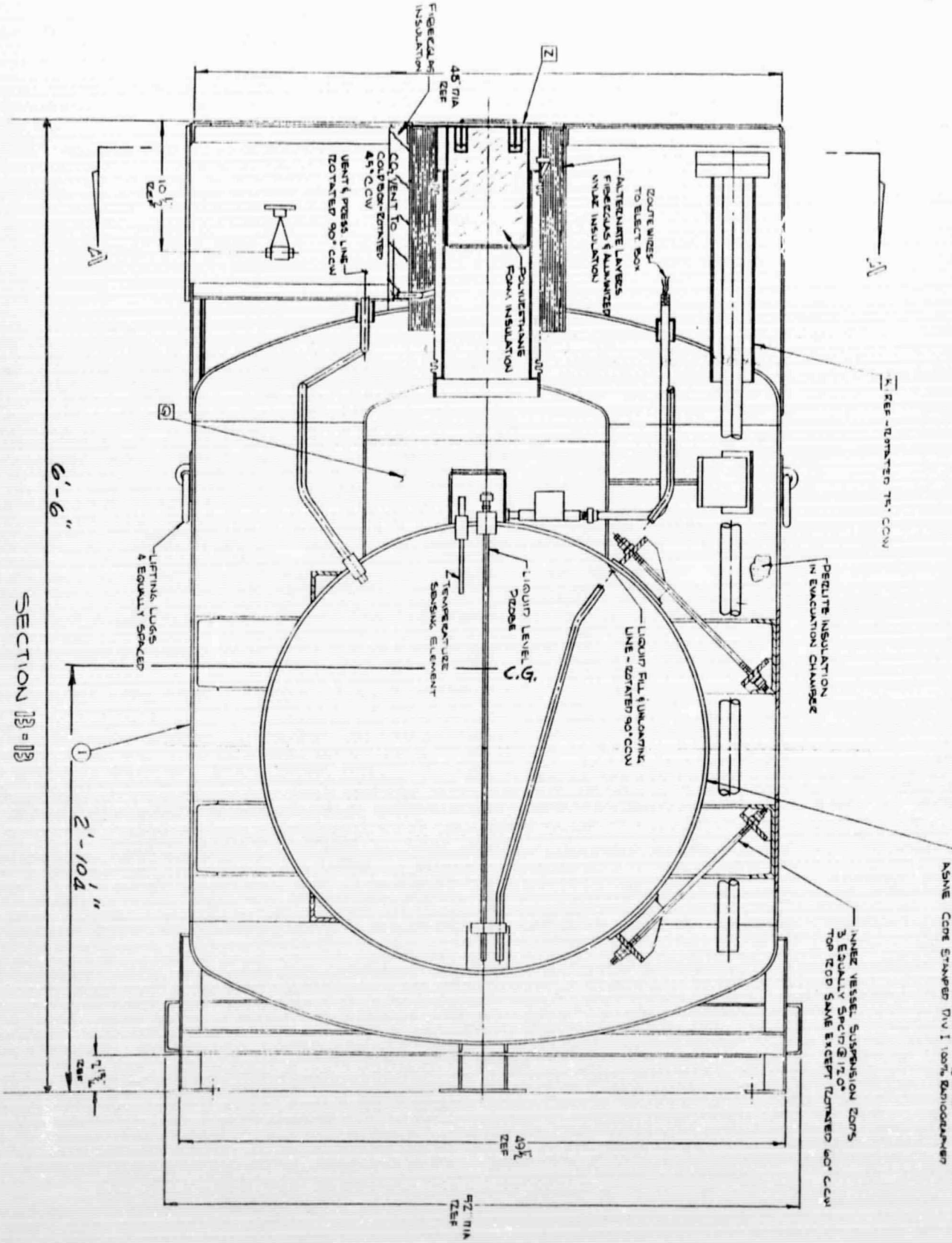


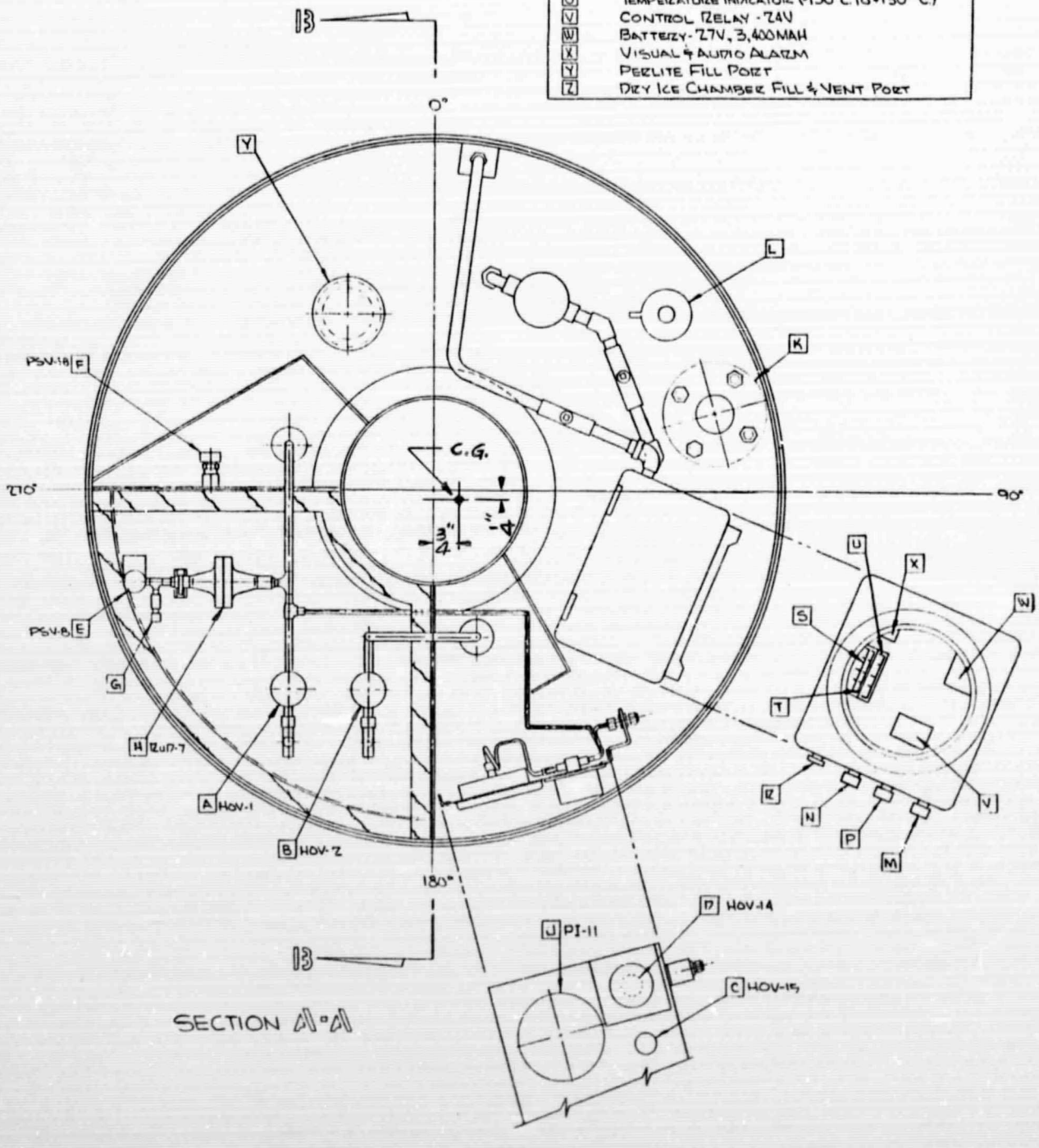
FIGURE 1 DIBORANE SHIPPING CONTAINER, ELEVATION VIEW

FIGURE 2

DIBORANE SHIPPING CONTAINER

PLAN VIEW

ITEM	DESCRIPTION
A	VENT VALVE & PRESSURIZATION VALVE
B	FILL VALVE & LIQUID UNLOADING VALVE
C	PRESSURE GAGE ISOLATION VALVE
D	PRESSURE GAGE PURGE VALVE
E	SAFETY VALVE SET @ 550 PSIG
F	SAFETY VALVE SET @ .5 PSI
G	EXCESS FLOW VALVE
H	RUPTURE DISC SET@ 550 PSIG
J	PRESS. GAGE -30" VAC -0 TO 1000 PSIG RANGE
K	FILTER ASSY W/HASTINGS DV6M VAC GAGE
L	LINDE OPERATOR 1/2" PUMP OUT VALVE
M	TEST-PUSH BUTTON
N	SILENCE-PUSH BUTTON
P	LEVEL INDICATOR PUSH BUTTON
Q	DRY ICE CHAMBER
R	ON-OFF SELECTOR SWITCH
S	VOLTMETER-LINEAR SCALE
T	LIQUID LEVEL INDICATOR
U	TEMPERATURE INDICATOR (-130°C. TO +130° C.)
V	CONTROL RELAY - 24V
W	BATTERY- 27V, 3,400 MAH
X	VISUAL & AUDIO ALARM
Y	PERLITE FILL PORT
Z	DRY ICE CHAMBER FILL & VENT PORT



200-POUND DIBORANE SHIPPING CONTAINER

PERFORMANCE

Container performance is summarized by Figure 3 and Table 1 in this section; complete information is given in the Data Tables Section following.

Limitation on safe storage or shipment time is pressure:

LIQUID TEMP., °C	VAPOR PRESSURE, psig	LIQUID FILL %
0	385	76
9.8	500	88
12.2	550	98
12.5	560	100

Complete liquid fill occurs at 12.5°C., whereas maximum working pressure of 500 psig is reached near 10°C. For a practical limit, Callery has chosen a pressure of 400 psig; which, allowing for small partial pressure of non-condensables, is equivalent to about 0°C. This then becomes the temperature at which the container should be iced to recool; realizing, however, that is not an absolute limit.

Secondly, from the product purity standpoint it is desirable that the normal maximum temperature be maintained about -25 to -35°C., below which decomposition is essentially nil. Initially -35°C. had been selected as the normal maximum

operating temperature; that is, the temperature reached by a container delivered within the time required by the shipping permit.

Figure 3 and Table 1 show that the dry ice was spent in fourteen days, but it was over twenty days before the contents reached -35°C. When the test was discontinued after 29 days, the pressure was 300 psig and the temperature was -10°C. Extrapolation of temperature rise at the same rate shows that 0°C. would not be reached until over 33 days. All of these data are based on an ambient temperature of 75°F.; however, ambient temperature occasionally rose as high as 92°F.

The performance achieved with this container is adequate for consideration of a 20-day shipping permit, both in terms of safety factor to locate and reice a lost shipment and in terms of preserving product purity. It should be possible, however, to routinely obtain delivery within fifteen days, particularly in view of the fact that we currently make all shipments within ten days. Use of a fifteen day permit will have the effect of expediting delivery more so than a twenty day permit. In any case the safe shipping time is well over thirty days.

FIGURE 3

30- DAY STORAGE TEST RESULTS

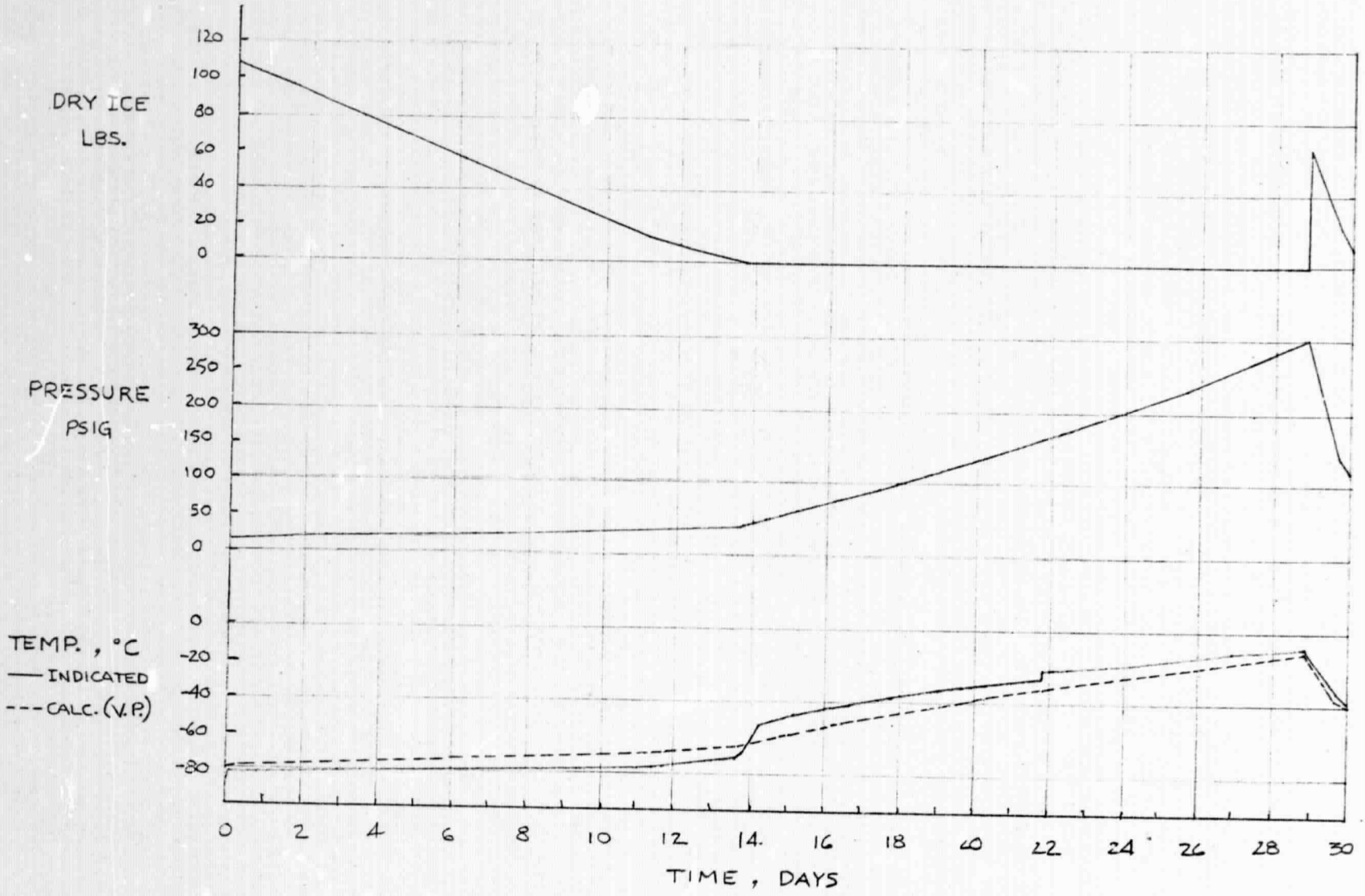


Table 1

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST RESULTS
SMOOTHED DATA-EVEN DAYS

TIME, DAYS	DRY ICE, POUNDS	PRESSURE PSIG	TEMP., °C
0	108.0	18.0	-79.0
1	101.2	21.5	-76.0
2	93.8	24.2	-74.2
3	85.4	26.5	-72.8
4	77.0	27.7	-72.1
5	68.6	29.0	-71.4
6	60.2	30.3	-70.7
7	51.8	31.6	-70.0
8	43.4	32.9	-69.3
9	35.0	34.2	-68.6
10	26.6	35.5	-67.9
11	18.2	36.8	-67.2
12	10.6	38.1	-66.6
13	4.7	40.0	-65.9
14	0	45.7	-63.5
15	0	59.5	-58.3
16	0	74.5	-53.0
17	0	89.5	-48.6
18	0	104.5	-44.3
19	0	119.5	-40.5
20	0	135.5	-37.0
21	0	151.5	-33.7
22	0	167.6	-30.7
23	0	184.6	-27.7
24	0	192.2	-24.9
25	0	219.8	-22.1
26	0	238.6	-19.4
27	0	259.5	-16.6
28	0	280.5	-13.7
*29	0	301.5	-10.8
*30	0	322.4	- 7.9
*31	0	343.4	- 5.3
*32	0	364.4	- 2.8
*33	0	385.4	- 0.5
*34	0	406.3	+ 1.6

*Extrapolation

200-POUND DIBORANE SHIPPING CONTAINER

DATA TABLES

This section contains complete data on the container preparation, charging, and storage test; as follows:

TABLE 2 — 30-DAY STORAGE TEST RESULTS
SMOOTHED DATA-LINEAR SEGMENTS

These results were obtained by plotting dry ice weight, container pressure, and container temperature data from Table 4; and fitting a series of straight lines through each set of data. This then became the basis for the even-day data given in Table 1.

TABLE 3 — PRECOOLING for
30-DAY STORAGE TEST

Prior to charging diborane, the container was precooled by charging liquid nitrogen into the inner tank. About one week was allowed for cooling to below -80°C., and the excess liquid nitrogen was removed prior to charging with diborane.

TABLE 4 DIBORANE CHARGE for 30-DAY STORAGE TEST

Diborane was charged in two steps, separated by a topping operation to remove non-condensables (nitrogen initially present and a small quantity of inerts fed with the diborane). The initial charge of 203.5 pounds was accomplished in about four hours using an external condenser, designed and operated to add the liquid diborane at about -75°C. After topping to a net weight of 197 pounds, the second charge was made; and after retopping, the final diborane net weight was 201.5 pounds.

TABLE 5 30-DAY STORAGE TEST COMPLETE DATA

Upon completion of the diborane charge, 108 pounds of dry ice was added; and the container was sealed for thermal testing. Ambient temperature was maintained at about 75°F.; however, with no cooling capability, this temperature occasionally ranged as high as 92°F. This phase of the test was discontinued after 29 days by adding dry ice to begin recooling, as sufficient data were available for reliable extrapolation to 0°C.

TABLE 6 POST-TEST RECOOL

Data records were continued during the recooling period to demonstrate that continued low-temperature storage is possible and practical. Temperatures below -70°C. were achieved.

Table 2

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST RESULTS
SMOOTHED DATA-LINEAR SEGMENTS

TIME DAYS	DRY ICE LBS	PRES. PSIG	TEMP °C. ACTUAL	TEMP °C. INDIC.	REMARKS
0.00	108.0	18	-79.0	-85.5	Start
0.01	-	-	-	-82	
0.10	-	19	-	-	
0.21	-	-	-77.5	-	
1.65	96.75	-	-	-	
2.65	-	26	-73.0	-	
11.29	15.75	-	-	-	
11.64	-	-	-	-77.5	
12.29	8.5	-	-	-	
12.68	-	39	-	-	
13.10	-	-	-65.8	-	
13.64	-	-	-	-71	
13.67	-	42	-65.0	-	
13.88	0	-	-	-68	
14.02	-	-	-	-61	
14.30	-	49	-62.1	-54	
15.10	-	-	-	-47	
15.81	-	-	-53.8	-	
16.66	-	-	-	-41	
17.86	-	-	-	-38.5	
18.29	-	-	-43.0	-	
19.03	-	120	-	-	
19.10	-	-	-	-32	Alarm
19.66	-	-	-	-30	
20.66	-	-	-34.7	-	
21.87	-	-	-	-26	
21.89	-	-	-	-21.5	Slosh
22.34	-	173	-	-	
23.22	-	-	-27.0	-	
24.65	-	-	-	-18	
25.64	-	231	-	-	
26.64	-	-	-17.6	-	
26.96	-	-	-	-10	
28.93	0	300	-11.0	- 9	
28.94	65.5	290	-12.3	-10	Dry Ice Added
29.72	22.5	140	-36.0	-33	
29.98	13.5	125	-39.2	-39	

DIBORANE SHIPPING CONTAINER - PRECOOLING

TIME	DATE	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VACUUM MICRONS	AMBIENT TEMP. °F.	SCALE READING LBS.	LN_2 WEIGHT LBS.	REMARKS
1320	4/13/71	29	-	24.5	-	2582.5	0	Started adding LN_2
1326	4/13/71	29	-	7.0	-	2583.5	1	
1328	4/13/71	29	-	5.5	-	2584	1.5	
1335	4/13/71	29	-	4.0	-	2585	2.5	
1350	4/13/71	29	-	3.5	-	2589	6.5	
1410	4/13/71	26	-	3.0	-	2603	20.5	
1425	4/13/71	25	-	2.9	-	2608	25.5	LN_2 off
1450	4/13/71	21	-	6.0	-	2602	19.5	LN_2 on
1503	4/13/71	20	-	3.0	-	2611	28.5	Compl 1st 50 l.
1505	4/13/71	-	-	-	-	-	-	Start 2nd 50 l.
1540	4/13/71	19	-	2.5	-	2678	95.5	Compl 2nd 50 l.
1542	4/13/71	-	-	-	-	-	-	Start 3rd 50 l. (half full)
1550	4/13/71	19	-	2.3	-	2695	112.5	Compl 3rd 50 l.
1605	4/13/71	14	19	16	-	2691	108.5	
1625	4/13/71	-	-	23	-	-	-	
0810	4/14/71	-60	30	0.5	50	2648	65.5	
0915	4/14/71	-62	30	0.8	53	2647	64.5	
1300	4/14/71	-70	30	0.9	58	2640	57.5	
1650	4/14/71	-74	29	0.6	60	2634	51.5	
2200	4/14/71	-80	29	0.1	56	2627	44.5	
0815	4/15/71	-89	30	0	50	2614	31.5	
0920	4/15/71	-88	29	0.3	55	2613	30.5	
1340	4/15/71	-88	29	0.9	65	2608	25.5	
1650	4/15/71	-88	29	0.8	63	2604	21.5	
2330	4/15/71	-88	28	0.2	54	2598	15.5	
0810	4/16/71	-90	30	0	54	2591	8.5	
0915	4/16/71	-90	8	0	56	2795	212.5	LN_2
1200	4/16/71	-92	18	1.0	67	2793	210.5	
1625	4/16/71	-93	29	1.4	69	2793	210.5	
1200	4/17/71	-100	39	0.3	60	2781	198.5	
2245	4/17/71	-101	39	0.2	59	2771	188.5	

DIBORANE SHIPPING CONTAINER - PRECOOLING

TIME	DATE	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VACUUM MICRONS	AMBIENT TEMP. °F.	SCALE READING LBS.	LN2 WEIGHT LBS.	REMARKS
1320	4/18/71	-103	39	1.1	70	2754	171.5	
0830	4/19/71	-103	38	0.4	61	2732	149.5	
0905	4/19/71	-102	40	0.5	63	2731	148.5	
1545	4/19/71	-102	38	2.1	79	2723	140.5	
2200	4/19/71	-103	38	1.0	65	2716	133.5	
0810	4/20/71	-102	40	0.2	57	2705	122.5	
1115	4/20/71	-103	75	2.8	70	2704	121.5	Leak Testing
1345	4/20/71	-102	205	1.7	73	-	-	Removed LN2
1620	4/20/71	-102	5	2.0	78	2588.5	-	
2000	4/20/71	-102	5	1.7	71	2588	-	
0805	4/21/71	-100	5	0.5	60	2588	-	

DIBORANE SHIPPING CONTAINER
DIBORANE CHARGE FOR 30-DAY STORAGE TEST

TIME	DATE	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VI %	CONTAINER LI %	CONTAINER VAC μ	COND INLET PSIG	AMB TEMP °F	SCALE READING LBS	B_2H_6 WEIGHT LBS	CHARGE TIME MIN.	REMARKS
0805	4/21/71	-100	5	-	0	0.5	-	60	-	-	-	Gas sample 1
0905	4/21/71	-	-	-	-	-	-	-	2580	-	-	Tare disconnected
1000	4/21/71	-	-	-	-	-	-	-	2600	-	-	Tare connected
1105	4/21/71	-98	0	-	-	0.6	-	61	2617	-	-	Dry ice added
1129	4/21/71	-	0	-	-	-	110	-	-	-	-	Open to cond.
1132	4/21/71	-98	0	80	0	0.4	-	59	2617	-	-	
1144	4/21/71	-	0	-	-	-	110	-	2617	0	0	Started charge
1146	4/21/71	-	10	-	-	-	-	-	2618	1	2	
1147	4/21/71	-98	10.5	-	-	-	-	-	2620	3	3	
1148	4/21/71	-	10.5	-	-	-	-	-	2622	5	4	
1150	4/21/71	-	10.5	-	-	-	101	-	2624	7	6	
1151	4/21/71	-	11	-	-	-	-	-	2625	8	7	
1153	4/21/71	-	11	-	-	-	96	-	2625	8	9	Dip tube plug
1156	4/21/71	-	11	-	-	-	82	-	2627	10	12	Tube opened
1157	4/21/71	-	11	-	-	-	84	-	2628	11	13	
1157.5	4/21/71	-98	12	-	-	-	84	-	2630	13	13.5	
1159	4/21/71	-98	13	80	7	-	90	-	2633	16	15	
1200	4/21/71	-98	-	-	-	-	-	-	2634	17	16	Closed B_2 feed
1233	4/21/71	-97	-	-	-	-	126	57	2635	18	-	
1241	4/21/71	-	14	-	-	-	122	-	2635	18	16	Opened B_2 feed
1242	4/21/71	-	-	-	-	-	-	-	2636	19	17	
1243	4/21/71	-	14	-	-	0.4	-	-	2638	21	18	
1243.5	4/21/71	-	-	-	-	-	-	-	2639	22	18.5	Reduced feed rate
1244	4/21/71	-	14	-	-	-	-	-	2641	24	19	
1245	4/21/71	-	16	-	-	-	-	-	2642	25	20	
1246	4/21/71	-	-	-	-	-	-	-	2644	27	21	
1248	4/21/71	-97	19	-	15	-	-	-	2646	29	23	
1249	4/21/71	-	-	-	-	-	-	-	2648	31	24	Reduced feed rate
1250	4/21/71	-	-	-	-	-	104	-	2649	32	25	
1251	4/21/71	-	20	-	-	-	-	-	2650.5	33.5	26	
1253	4/21/71	-	20	-	-	-	-	-	2652.5	35	28	
1255	4/21/71	-	-	-	-	-	-	-	2653	36	30	
1257.5	4/21/71	-	-	-	-	-	-	-	2655	38	32.5	

DIBORANE SHIPPING CONTAINER
DIBORANE CHARGE FOR 30-DAY STORAGE TEST

TIME	DATE	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VI %	CONTAINER LI %	CONTAINER VAC ~	COND INLET PSIG	AMB TEMP °F	SCALE READING LBS	B_2H_6 WEIGHT LBS	CHARGE TIME MIN.	REMARKS
1259	4/21/71	-	20	-	-	-	-	-	2657	40	34	
1301	4/21/71	-	-	-	-	-	98	-	2659	42	36	
1304	4/21/71	-96	20	-	21	-	-	-	2661	44	39	
1306	4/21/71	-	20	-	-	-	-	-	2663	46	41	
1308	4/21/71	-	21	-	-	-	-	-	2665	48	43	
1311	4/21/71	-	21	-	-	-	94	-	2667	50	46	
1313	4/21/71	-96	21	-	-	-	94	-	2669	52	48	
1316	4/21/71	-	22	-	-	-	-	-	2671	54	51	
1318	4/21/71	-	24	-	-	-	-	-	2673	56	53	
1321	4/21/71	-95	24	-	-	-	90	-	2675	58	56	
1323	4/21/71	-	-	-	-	-	-	-	2677	60	58	
1325	4/21/71	-	25	-	-	-	87	-	2679	62	60	
1328	4/21/71	-	27	-	-	-	-	-	2681	64	63	
1331	4/21/71	-	27	-	-	-	86	-	2683	66	66	
1333	4/21/71	-	-	-	-	-	-	-	2685	68	68	
1336	4/21/71	-	30	-	30	-	-	-	2687	70	71	
1338	4/21/71	-95	30	-	-	-	84	-	2689	72	73	
1340.5	4/21/71	-	30	-	-	-	-	-	2691	74	75.5	
1345	4/21/71	-	30	-	-	-	-	-	2695	78	80	
1348	4/21/71	-	30	-	-	-	-	-	2697	80	83	
1350.5	4/21/71	-	-	-	-	-	87	-	2699	82	85.5	
1353	4/21/71	-	-	-	-	-	-	-	2701	84	88	
1355	4/21/71	-	-	-	-	-	-	-	2703	86	90	
1358	4/21/71	-95	31	-	35	-	92	-	2705	88	93	
1359.5	4/21/71	-	31	-	-	-	-	-	2707	90	94.5	
1401	4/21/71	-	31	-	-	-	-	-	2709	92	96	
1403.5	4/21/71	-	-	-	-	-	93	-	2711	94	98.5	
1406	4/21/71	-	32	-	-	-	-	-	2713	96	101	
1408.5	4/21/71	-	-	-	-	-	-	-	2715	98	103.5	
1411	4/21/71	-	35	-	-	-	93	-	2717	100	106	
1413	4/21/71	-95	35	-	38	-	-	-	2719	102	108	
1415	4/21/71	-95	35	-	-	-	93	-	2721	104	110	

DIBORANE SHIPPING CONTAINER
DIBORANE CHARGE FOR 30-DAY STORAGE TEST

TIME	DATE	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VI %	CONTAINER LI %	CONTAINER VAC μ	COND INLET PSIG	AMB TEMP °F	SCALE READING LBS	B_2H_6 WEIGHT LBS	CHARGE TIME MIN.	REMARKS
1417	4/21/71	-	37	-	-	-	-	-	2723	106	112	
1419	4/21/71	-	37	-	-	-	95	-	2725	108	114	
1421	4/21/71	-	38	-	-	0.2	-	55	2727	110	116	
1423	4/21/71	-	39	-	-	-	-	-	2729	112	118	
1426	4/21/71	-	39	-	-	-	98	-	2731	114	121	
1428	4/21/71	-	40	-	43	-	-	-	2733	116	123	
1430	4/21/71	-	40	-	-	-	-	-	2735	118	125	
1431.5	4/21/71	-	40	-	-	-	100	-	2737	120	126.5	
1433.5	4/21/71	-	40	-	-	-	-	-	2739	122	128.5	
1436	4/21/71	-	40	-	-	-	98	-	2741	124	131	
1438	4/21/71	-	40	-	-	-	-	-	2743	126	133	
1440	4/21/71	-	40	-	-	-	-	-	2745	128	135	
1443	4/21/71	-	40	-	-	-	-	-	2747	130	138	
1445	4/21/71	-	40	-	-	-	-	-	2749	132	140	
1506	4/21/71	-91	43	-	51	0.2	-	55	2767.5	150.5	161	
1509	4/21/71	-	43	-	-	-	-	-	2770	153	164	
1515	4/21/71	-91	45	-	-	-	82	-	2775	158	170	
1522	4/21/71	-91	46	-	-	-	81	-	2780	163	176	
1528	4/21/71	-91	47	-	-	-	78	-	2785	168	182	
1535	4/21/71	-91	48	-	-	-	76	-	2790	173	189	
1540	4/21/71	-91	49	-	60	-	75	-	2793	176	194	
1544	4/21/71	-91	49	-	-	-	72	-	2796	179	198	
1550	4/21/71	-	50	-	-	-	71	-	2798.5	181.5	204	
1552	4/21/71	-	50	-	-	-	-	-	2800	183	206	
1554	4/21/71	-91	50	-	-	0.2	69	56	2801	184	208	
1558	4/21/71	-91	50	-	-	-	68	-	2803	186	212	
1601	4/21/71	-91	50	-	-	-	65	-	2805	188	215	
1603	4/21/71	-	50	-	-	-	-	-	2806	189	217	
1606	4/21/71	-90.5	50	-	-	-	64	-	2807	190	220	
1609	4/21/71	-90.5	50	-	-	-	-	-	2809	192	223	
1612	4/21/71	-90	50	-	-	-	64	-	2810	193	226	
1618	4/21/71	-90.5	50	-	-	-	62	-	2812	195	232	

DIBORANE SHIPPING CONTAINER
DIBORANE CHARGE FOR 30-DAY STORAGE TEST

TIME	DATE	TI °C	PI PSIG	VI %	LI %	VAC ~	COND INLET PSIG	AMB TEMP °F	SCALE READING LBS	B_2H_6 WEIGHT LBS	CHARGE TIME MIN.	REMARKS
1620	4/21/71	-90/5	50	-	65	-	62	-	2813.5	196.5	234	
1624	4/21/71	-90.5	50	-	-	-	63	-	2815	198	238	
1627	4/21/71	-90	50	-	-	-	63	59	2816	199	241	
1632	4/21/71	-90	50	-	-	-	62	-	2816.5	199.5	246	
1636	4/21/71	-90	50	-	65	0.2	62	58	2817	200	250	
1643	4/21/71	-90	50	-	-	-	60	57	2818	201	257	
1646	4/21/71	-90	51	79	-	-	60	-	2818	201	260	
1650	4/21/71	-90	51	-	65	0.2	58	57	2818.5	201.5*	264	Closed B_2 feed.
1920	4/21/71	-89.5	55	78	65	0.1	-	52	2818	-	-	
2340	4/21/71	-89	55	78	65	0	-	48	2817	-	-	
0825	4/22/71	-87	58	78	65	0	-	50	2815	-	-	
0835	4/22/71	-	-	-	-	-	-	-	2803.5	203.5*	-	Weight w/o dry ice
1115	4/22/71	-86	29	-	-	0.3	-	49	2809.5	-	-	Started topping @0845
1200	4/22/71	-86	26	-	-	0.3	-	49	2808	-	-	Stopped topping
1242	4/22/71	-	22	-	-	-	-	-	2811	-	-	Started topping
1310	4/22/71	-86	22	-	-	0.3	-	49	2807	-	-	
1330	4/22/71	-	20	-	-	-	-	-	2806.5	-	-	
1345	4/22/71	-86	19	-	-	-	-	55	2805.5	-	-	Gas Sample 2
1350	4/22/71	-86	18	-	-	-	-	-	2805.5	-	-	Finished topping
1400	4/22/71	-	-	-	-	-	-	-	2796.5	196.5	-	Weight w/o dry ice
1403	4/22/71	-86	18	-	-	-	-	-	2805	197	264	Weight with dry ice
1405	4/22/71	-	19	-	-	-	105	-	2805.5	197.5	266	Restarted B_2 feed
1406	4/22/71	-	20	-	-	-	-	-	2806	198	267	
1407	4/22/71	-	-	-	-	-	-	-	2806	198	268	Increased feed rate
1408	4/22/71	-	20	-	-	-	-	-	2807	199	269	
1409	4/22/71	-	20	-	-	-	-	-	2808	200	270	
1410	4/22/71	-	-	-	-	0.3	90	49	2809	201	271	
1411	4/22/71	-	21	-	-	-	-	-	2810	202	272	
1411.5	4/22/71	-	21	-	-	-	-	-	2810.5	202.5	272.5	Stopped feeding
1412	4/22/71	-	-	-	-	-	-	-	2811	203	273	Weight with dry ice
1415	4/22/71	-	-	-	-	0.2	110	50	2803	203.0		Weight w/o dry ice
1525	4/22/71	-86	18	-	-	0.3	-	51	2810.75	203.0	-	Weight with dry ice

*Actual B_2H_6 weight 203.5 due to 2.0 lbs. dry ice loss during charging.

DIBORANE SHIPPING CONTAINER
DIBORANE CHARGE FOR 30-DAY STORAGE TEST

TIME	DATE	TI °C	PI PSIG	VI %	LI %	VAC	COND INLET PSIG	AMB TEMP °F	SCALE READING LBS	B_2H_6 WEIGHT LBS	CHARGE TIME MIN.	REMARKS
1540	4/22/71	-	-	78	66	-	-	-	2810.5	203.5	-	Start topping
1545	4/22/71	-86	19	-	-	0.3	-	52	2810	-	-	
1555	4/22/71	-86	18	-	-	-	-	-	2810	-		Gas Sample 3
1600	4/22/71	-86.5	18	78	65	0.3	-	53	2809.5	-	-	Finished topping
1601	4/22/71	-	-	-	-	-	-	-	2801.5	201.5	-	Weight w/o dry ice
1615	4/22/71	-	-	-	-	-	-	-	2781.5	201.5	-	Disconnected
1617	4/22/71	-	-	-	-	-	-	-	2783	-	-	PSV Connected
1645	4/22/71	-85.5	18	78	0	0.3	-	54	2891	-	-	Dry ice charged Start of test

TABLE 5 PAGE 1 OF 5

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST

TIME	DATE	DAYS	CONTAINER TI °C	CONTAINER PI PSIG	CONTAINER VI %	CONTAINER LI %	CONTAINER VACUUM MICRONS	AMB TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
1645	4/22/71	0.00	-85.5	18	78	0	0.3	-	2891.0	108	Start of test
1700	4/22/71	0.01	-82	18	-	-	0.9	74	2891.0	108	
1915	4/22/71	0.10	-82	19	-	-	1.4	69	2890.75	107.75	
2145	4/22/71	0.21	-82	19.5	-	-	1.8	73	2890.0	107	
2400	4/22/71	0.30	-82	19.5	-	-	1.8	71	2889.25	106.25	
0810	4/23/71	0.64	-82	20.5	79	0	2.0	72	2887.0	104	
0840	4/23/71	0.66	-82	20.5	-	-	2.0	71	2887.0	104	
1505	4/23/71	0.93	-82	21	-	-	2.0	72	2885.0	102	
1645	4/23/71	1.00	-82	21	81	0	2.1	76	2884.5	101.5	
1915	4/23/71	1.10	-82	22	-	-	2.3	77	2883.75	100.75	
0045	4/24/71	1.33	-82	23	82	0	2.4	78	2881.75	98.75	
0815	4/24/71	1.65	-82	23	82	0	2.3	74	2879.75	96.75	
1755	4/24/71	2.05	-82	24	82	0	2.3	72	2876.25	93.25	
0815	4/25/71	2.65	-82	26	82	0	2.3	73	2872.0	89	
1330	4/25/71	2.86	-82	26	82	0	2.6	74	2870.0	87	
2400	4/25/71	3.30	-82	27	82	0	2.7	77	2866.0	83	
0815	4/26/71	3.65	-82	27.5	81	0	2.5	82	2863.5	80.5	
0845	4/26/71	3.67	-82	27.5	82	0	2.7	73	2863.25	80.25	
1525	4/26/71	3.94	-82	28	-	-	2.7	72	2861.5	78.5	
2345	4/26/71	4.29	-81	28	82	0	2.9	74	2857.75	74.75	
0810	4/27/71	4.64	-81	29	82	0	2.8	74	2855.0	72	
0840	4/27/71	4.66	-81	29	82	65	2.9	73	2854.5	71.5	
1305	4/27/71	4.85	-81	29	82	65	3.0	72	2852.75	69.75	
1600	4/27/71	4.97	-81	29	-	-	3.0	76	2852.0	69	
1645	4/27/71	5.00	-80.5	29.5	81	65	2.9	73	2851.75	68.75	
1930	4/27/71	5.11	-80.5	29.5	81	65	3.1	77	2850.75	67.75	
2400	4/27/71	5.30	-80.5	29.5	81	65	3.3	75	2849.0	66.0	
0810	4/28/71	5.64	-80.5	30	81	65	3.0	72	2846.0	63.0	
0845	4/28/71	5.67	-80	30	81	65	3.2	74	2846.0	63.0	
1500	4/28/71	5.93	-80	30.5	81	65	3.8	77	2844.0	61.0	
1930	4/28/71	6.11	-80	31	81	65	3.4	75	2842.0	59.0	

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST

TIME	DATE	DAYS	CONTAINER TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
2345	4/28/71	6.29	-80	31	81	65	3.4	74	2840.75	57.75	
0810	4/29/71	6.64	-80	31	81	65	3.5	76	2837.5	54.5	
0845	4/29/71	6.67	-80	31	81	0	3.7	75	2837.75	54.75	
1320	4/29/71	6.86	-79.5	31	82	0	3.7	76	2835.75	52.75	
1500	4/29/71	6.93	-80	31	-	-	3.5	78	2835.5	52.5	
1615	4/29/71	6.98	-79	32	82	0	3.8	78	2835.0	52.0	
1915	4/29/71	7.10	-79	32	82	0	3.7	75	2834.0	51.0	
2350	4/29/71	7.30	-79	32	82	0	3.7	75	2832.25	49.25	
0810	4/30/71	7.64	-79	32	81	65	3.8	74	2829.5	46.5	
0840	4/30/71	7.66	-79	33	81	65	3.9	75	2829.25	46.25	
1555	4/30/71	7.97	-79	32	-	-	3.8	72	2827	44.0	
1600	4/30/71	7.97	-79	33	81	65	4.0	77	2826.75	43.75	
1915	4/30/71	8.10	-79	33	81	65	3.8	74	2825.75	42.75	
2345	4/30/71	8.29	-79	33.5	81	65	3.8	73	2824	41.0	
0910	5/1/71	8.68	-78.5	34	81	65	4.0	76	2821	38.0	
1745	5/1/71	9.04	-78.5	34.5	81	65	3.9	74	2818	35.0	
0820	5/2/71	9.65	-78	35	81	65	4.0	75	2812.75	29.75	
1325	5/2/71	9.86	-78	35	81	65	4.0	74	2811.0	28.0	
1915	5/2/71	10.10	-78	35	81	65	3.9	73	2808.75	25.75	
2345	5/2/71	10.29	-78	35	81	65	4.0	74	2807.25	24.25	
0810	5/3/71	10.64	-78	35	81	65	4.0	75	2804.0	21.0	
0845	5/3/71	10.67	-78	36	81	65	4.2	77	2804.0	21.0	
1550	5/3/71	10.96	-78	36	-	-	4.0	78	2801.5	18.5	
1645	5/3/71	11.00	-77.5	36	81	65	4.1	75	2801.25	18.25	
1930	5/3/71	11.11	-77.5	36	81	65	3.9	75	2800.25	17.25	
2345	5/3/71	11.29	-77.5	36	81	65	3.9	76	2798.75	15.75	
0810	5/4/71	11.64	-77.5	37	81	65	3.9	71	2796.0	13.0	
0900	5/4/71	11.68	-77.5	37	81	65	4.2	75	2796.0	13.0	

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST

TIME	DATE	DAYS	TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB. TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
1340	5/4/71	11.92	-77	37	81	65	4.2	73	2794.5	11.5	
1520	5/4/71	11.94	-77	38	-	-	4.0	72	2794	11.0	
1915	5/4/71	12.10	-77	37	81	65	4.2	78	2793	10.0	
2345	5/4/71	12.29	-76	38	81	65	4.3	75	2791.5	8.5	
0810	5/5/71	12.64	-76	39	81	65	4.2	72	2789.0	6.0	
0900	5/5/71	12.68	-75	39	81	66	4.4	74	2788.0	5.0	
1420	5/5/71	12.90	-74.5	39.5	80	67	5.1	78	2787.5	4.5	
1525	5/5/71	12.94	-75	40	-	-	4.8	75	2787.0	4.0	
1700	5/5/71	13.01	-73.5	40	81	67	4.8	75	2786.75	3.75	
1915	5/5/71	13.10	-73.5	40	81	67	4.8	78	2786	3.0	
2345	5/5/71	13.29	-72.5	41	81	67	4.8	75	2785	2.0	
0810	5/6/71	13.64	-71	42	81	67	4.9	76	2783	0	
0855	5/6/71	13.67	-71	42	81	67	5.0	78	2783.25	0.25	
1350	5/6/71	13.88	-68	43	80	67.5	5.1	74	2782.25	-0.25	
1545	5/6/71	13.96	-66	43	-	-	4.9	72	2782.5	-0.5	
1710	5/6/71	14.02	-61	46	81	68.5	5.1	75	2782.25	-0.75	
1915	5/6/71	14.10	-58.5	47	81	69	5.1	75	2782.5	-0.5	
2400	5/6/71	14.30	-54	49	81	69	5.6	75	2782.25	-0.75	
0810	5/7/71	14.64	-51	52	81	71	5.5	74	2782.25	-0.75	
0840	5/7/71	14.66	-50	53.5	81	71	5.7	75	2782.5	-0.5	
1305	5/7/71	14.85	-49.5	58	81	71	6.1	76	2782.5	-0.5	
1530	5/7/71	14.95	-49	59	-	-	6.2	78	2782.25	-0.75	
1645	5/7/71	15.00	-48	60	81	72	6.7	79	2782.5	-0.5	
1915	5/7/71	15.10	-47	61	81	72	6.6	76	2782.5	-0.5	
2345	5/7/71	15.29	-46.5	63	81	71	6.3	75	2782.5	-0.5	
1210	5/8/71	15.81	-44	72	81	71	6.6	74	2782.75	-0.25	
1755	5/8/71	16.05	-43	74	81	70	6.7	75	2782.5	-0.5	
0830	5/9/71	16.66	-41	83	81	70	6.8	74	2782.5	-0.5	
1340	5/9/71	16.87	-40.5	88	81	71	7.7	78	2782.25	-0.75	
1745	5/9/71	17.04	-40	90	81	72	8.3	78	2782.5	-0.5	

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST

TIME	DATE	DAYS	TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
2030	5/9/71	17.16	-39.5	91	81	71	8.1	76	2782.5	-0.5	
2400	5/9/71	17.30	-39.5	93	81	71	7.9	76	2782.25	-0.75	
0815	5/10/71	17.65	-39.5	100	81	71	7.5	82	2782.25	-0.75	
0820	5/10/71	17.65	-39	100	-	-	7.5	-	-	-	
1320	5/10/71	17.86	-38.5	102	81	72	8.8	80	2782.5	-0.5	
1550	5/10/71	17.96	-39	102	-	-	9.0	80	2782.25	-0.75	
1600	5/10/71	17.97	-37.5	103	81	71	9.4	81	2782.5	-0.5	
1915	5/10/71	18.10	-37	106	81	71.5	9.7	80	2782.5	-0.5	
2145	5/10/71	18.21	-36	108	81	71	9.1	75	2782.5	-0.5	
2345	5/10/71	18.29	-36	109	81	71	9.1	75	2782.5	-0.5	
0810	5/11/71	18.64	-35	112	81	71	8.5	72	2782.25	-0.75	
0840	5/11/71	18.66	-35	113	81	70	8.8	76	2782.25	-0.5	
1105	5/11/71	18.76	-35	117	81	71	9.6	80	2782.5	-0.5	
1320	5/11/71	18.86	-34.5	118	81	71	10.1	81	2782.5	-0.5	
1500	5/11/71	18.93	-34	119	81	72	11.0	82	2782.5	-0.5	
1535	5/11/71	18.95	-34	119	-	-	10.5	83	2782.25	-0.75	
1645	5/11/71	19.00	-33.5	120	81	71	11.5	84	2782.5	-0.5	
1725	5/11/71	19.03	-33	120	81	71	11.5	84	2782.5	-0.5	
1915	5/11/71	19.10	-32	121	63	86	11.5	81	2782.5	-0.5	Alarm Sounded
0100	5/12/71	19.34	-31	127	55	100	10.5	76	2782.5	-0.5	
0815	5/12/71	19.65	-30.5	130	21	30	10.0	74	2782.5	-0.5	
0830	5/12/71	19.66	-30	131	55	100	10.2	75	2782.5	-0.5	
1315	5/12/71	19.85	-30	133	13	0	11.0	79	2782.5	-0.5	
1600	5/12/71	19.97	-30	136	-	-	10.5	74	2782.5	-0.5	
1715	5/12/71	20.02	-29.5	137	22	28	10.5	74	2782.5	-0.5	
1915	5/12/71	20.10	-29.5	138	24	29	10.2	75	2782.5	-0.5	
2345	5/12/71	20.29	-29.5	140	23	32	10.2	74	2782.5	-0.5	
0810	5/13/71	20.64	-29	148	24	40	9.9	72	2782.5	-0.5	
0835	5/13/71	20.66	-29	147	24	32	10.2	75	2782.5	-0.5	
1645	5/13/71	21.00	-28	152	25	30	9.8	73	2782.5	-0.5	

DIBORANE SHIPPING CONTAINER
30-DAY STORAGE TEST

TIME	DATE	DAYS	TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB. TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
1905	5/13/71	21.10	-28	153	21	28	9.8	75	2782.5	-0.5	
0140	5/14/71	21.37	-27.5	158	25	32	9.8	74	2782.5	-0.5	
0810	5/14/71	21.64	-26.5	160	24	39	9.8	72	2782.5	-0.5	
0845	5/14/71	21.67	-26.5	163	-	-	9.7	74	2782.5	-0.5	
1340	5/14/71	21.87	-26	166	-	-	10.5	77	2782.5	-0.5	Start Sloshing
1405	5/14/71	21.89	-21.5	166	-	-	11.0	77	2782.0	-1.0	Finish Sloshing
1915	5/14/71	22.10	-21.5	170	-	-	11.5	76	2782.5	-0.5	
0100	5/15/71	22.34	-21.5	173	-	-	11.0	80	2782.5	-0.5	
0945	5/15/71	22.71	-21.0	180	-	-	10.5	75	2782.5	-0.5	
1745	5/15/71	23.04	-20.5	187	-	-	13.0	82	2782.75	-0.25	
2200	5/15/71	23.22	-20.0	190	-	-	13.0	79	2782.75	-0.25	
0830	5/16/71	23.66	-19.5	197	-	-	12.5	75	2782.75	-0.25	
1400	5/16/71	23.89	-19.5	202	-	-	15.0	84	2782.75	-0.25	
0815	5/17/71	24.65	-18	215	25	30	12.5	72	2782.5	-0.5	
1600	5/17/71	24.97	-17	220	-	-	16	84	2782.5	-0.5	
1730	5/17/71	25.03	-18	220	-	-	17	83	-	-	
0800	5/18/71	25.64	-14	231	-	-	13	70	-	-	
0810	5/18/71	25.64	-15	232	24	30	14	72	2782.5	-0.5	
1550	5/18/71	25.96	-14	240	-	-	19	92	2782.5	-0.5	
0800	5/19/71	26.64	-11	251	-	-	16	74	-	-	
0807	5/19/71	26.64	-10.5	250	0	0	16	74	2782.5	-0.5	
1545	5/19/71	26.96	-10	260	-	-	21	91	2782.5	-0.5	
0805	5/20/71	27.64	-10	270	3	0	19	76	2782.5	-0.5	
1545	5/20/71	27.96	- 9.9	280	-	-	21	85	2782.5	-0.5	
0807	5/21/71	28.64	- 9.5	290	3	0	17	72	2782.5	-0.5	
0815	5/21/71	28.65	- 8	290	-	-	17.5	75	-	-	
1500	5/21/71	28.93	- 9	300	-	-	20	82	2782.5	-0.5	End of Test
1520	5/21/71	28.94	-10	290	-	-	19.5	80	2848.0	65.5	Dry Ice Added

DIBORANE SHIPPING CONTAINER
POST-TEST RECOOL

TIME	DATE	DAYS	TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB. TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
0807	5/21/71	28.64	- 9.5	290	3	0	17	72	2782.5	-0.5	
0815	5/21/71	28.65	- 8	290	-	-	17.5	75	-	-	
1500	5/21/71	28.93	- 9	300	-	-	20	82	2782.5	-0.5	End of Test
1520	5/21/71	28.94	-10	290	-	-	19.5	80	2848.0	65.5	Dry Ice Added
1000	5/22/71	29.72	-33	140	-	-	10.5	70	2805.0	22.5	
1620	5/22/71	29.98	-39	125	-	-	10.0	74	2796.0	13.5	
1630	5/22/71	29.99	-41	121	-	-	9.5	74	2866.0	83.5	Dry Ice Added
2245	5/23/71	31.25	-53	70	-	-	6.0	68	2830.5	48.0	
0815	5/24/71	31.65	-59	60	5	0	4.9	68	2822.5	40.0	
1600	5/24/71	31.97	-60	57	-	-	5.9	80	2816.5	34.0	
0805	5/25/71	32.64	-62	50	5	0	5.3	76	2805.0	22.5	
1550	5/25/71	32.96	-65	48	-	-	5.5	78	2800.0	17.5	
0010	5/26/71	33.31	-63.5	43	-	-	5.0	74	2796.0	13.5	
0807	5/26/71	33.64	-66	42	5	0	4.1	69	2792.5	10.0	
1500	5/26/71	33.93	-65	40	-	-	4.3	68	2790.0	7.5	
2200	5/26/71	34.22	-66	42	-	-	4.3	71	2787.5	5.0	
0810	5/27/71	34.64	-66	42	5	0	3.9	66	2785	2.5	
1535	5/27/71	34.95	-66	45	-	-	4.5	71	2783.5	1.0	
0930	5/28/71	35.70	-55	52	-	-	4.0	63	2782.5	0	
1500	5/28/71	35.93	-52	59	-	-	5.2	72	2782.5	0	
1545	5/28/71	35.96	-60	55	-	-	4.8	68	2867.5	85.0	Dry Ice Added
2215	5/28/71	36.24	-63	47	-	-	3.4	67	2860.5	78.0	
1030	5/29/71	36.74	-68	42	-	-	2.6	65	2852.5	70.0	
1750	5/30/71	38.04	-71	37	-	-	3.8	76	2837.0	54.5	
1140	5/31/71	38.79	-72	36	-	-	4.2	74	2829.0	46.5	
2400	5/31/71	39.30	-72	34	-	-	3.8	75	2824.0	41.5	
0810	6/1/71	39.64	-72	35	5	0	3.6	72	2820.5	38	
1555	6/1/71	39.97	-72	35	-	-	5.5	88	2817.0	34.5	
2050	6/1/71	40.17	-72	32	-	-	5.4	83	2815.0	32.5	
0815	6/2/71	40.65	-72	32	5	0	4.9	78	2810.0	27.5	
1600	6/2/71	40.97	-72	31	-	-	4.9	77	2807.5	25.0	
0810	6/3/71	41.64	-72	31	5	0	4.9	77	2801.5	19.0	

DIBORANE SHIPPING CONTAINER
POST-TEST RECOOL

TIME	DATE	DAYS	TI °C	PI PSIG	VI %	LI %	VACUUM MICRONS	AMB. TEMP °F	SCALE READING LBS	DRY ICE, LBS.	REMARKS
1600	6/3/71	41.97	-72	31	-	-	6.0	88	2798.5	16	
0810	6/4/71	42.64	-72	31	-	-	4.9	76	2792.5	10	
1405	6/4/71	42.89	-72	31	-	-	7.0	90	2790.5	8	
1425	6/4/71	42.90	-72	31	-	-	6.9	86	2853.5	71	Dry Ice Added
1925	6/4/71	43.11	-73	33	-	-	5.4	83	2850	67.5	
1145	6/5/71	43.79	-74	31	-	-	4.4	80	2842	59.5	
1430	6/6/71	44.91	-74	31	-	-	4.7	83	2833	50.5	
2345	6/6/71	45.29	-74	30	-	-	3.2	70	2826.5	44	

200-POUND DIBORANE SHIPPING CONTAINER

DRAWINGS

Following is a complete list of as-built drawings for fabrication and assembly of the 200-pound diborane shipping container. A copy of each drawing is enclosed with this document.

A458-5800	Flow Schematic
A458-5801	Final Assembly
A458-5802 Sh 1 & 2	Piping and Instruments
A458-5803 Sh 1 & 2	Main Assembly
A458-5804 Sh 1 & 2	Inner Vessel - Assembly Of
A458-5805	Inner Vessel - Details
A458-5806 Sh 1 & 2	Top Head - Assembly Of
A458-5807	Top Head - Details
A458-5808	Vacuum Filter - Assembly Of
A458-5809	Bottom Head - Assembly & Detail
A458-5810	Thermal Plug - Assembly Of
A458-5811	Suspension Bracket - Assembly Of
A458-5812 Sh 1 & 2	Suspension Bracket - Details
A458-5813	Bracket-Pressure Gage
A458-5814	Standoff Ring - Assembly Of
A458-5815	Lifting Bracket Details
A458-5816	Outer Shell - Assembly Of
A458-5817	Top Panel - Assembly Of
A458-5818 Sh 1 & 2	Side Panel - Assembly Of
A458-5819	Valve Cover - Assembly Of
A458-5820	Fill Port - Perlite, Assembly & Detail
A458-5821 Sh 1 & 2	Electrical Schematic & Panel Layout